Abstracts

On the Resonant-Cavity Method for Measurement of Varactors

F. Keywell. "On the Resonant-Cavity Method for Measurement of Varactors." 1962 Transactions on Microwave Theory and Techniques 10.6 (Nov. 1962 [T-MTT]): 567-578.

An extension of Houlding's method for measurement of varactor quality has been developed by using a swept-bias voltage instead of a discrete step in bias. The method can be used to measure the cutoff frequency of high-Q varactors if the law of capacitance variation is known. In this case, it is not necessary to measure capacity or reactance since cutoff frequency is shown to be determined by reflected power on a microwave-reflectometer system. The Sweep-Voltage Method places emphasis on the measurement of reflected power and a test bench is described for application of the method. The series resistance of high-voltage epitaxial varactors is shown, by calculation and experimental data, to be a function of bias. This is due to space-charge layer widening which causes the epitaxial base layer to vary in length. For this reason it is advantageous to compare high-voltage epitaxial varactors by sweeping the bias over a broad range of the diode characteristics. Data is given for typical per cent of reflected microwave power R for 6.5-, 15-, and 100-v varactors where the varactor is matched to the line at 2.00-, 5.00- and 15.0-v bias and a sine wave at 100 kc with amplitude 4.00, 10.0 or 30.0 v is superimposed on the bias. The measurements are independent of the power incident on the varactor to a level of 700 μw.

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